

GRADE 8



MeCAS

Maine's Comprehensive
Assessment System

MeCAS ONLINE SCIENCE PILOT ITEMS

Maine Department of Education

SCIENCE PILOT PRACTICE TEST

This practice session has twenty multiple-choice and two constructed-response questions.

1 How many times does Earth rotate on its axis in one day?

- A. once
- B. twice
- C. 24 times
- D. 365 times

2 Which device produces mechanical energy?

- A. a battery
- B. an electric motor
- C. a lightbulb
- D. a solar cooker

3 The picture below shows a maple seed.



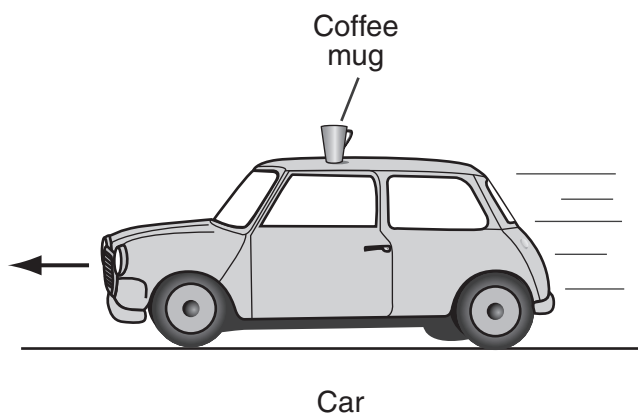
How will this type of seed **most likely** be spread?

- A. by the Sun
- B. by birds
- C. by insects
- D. by the wind

PLEASE GO ON ➡

- 4 Which statement describes the location of our Sun in the universe?
- A. Our Sun orbits Earth in the Andromeda galaxy.
 - B. Our Sun orbits Earth in the Milky Way galaxy.
 - C. Our Sun is the center of a solar system in the Milky Way galaxy.
 - D. Our Sun is the center of a solar system in the Andromeda galaxy.

- 5 A teacher leaves a coffee mug on top of a car, as shown in the diagram below.



The teacher drives the car in a straight line and then stops suddenly. What happens to the coffee mug when the car stops?

- A. The mug moves forward.
- B. The mug moves backward.
- C. The mug moves side to side.
- D. The mug stays in the same position.

- 6 Which event would **most likely** cause a rapid extinction of organisms?

- A. a large asteroid impact
- B. regional drought
- C. new glacier formation
- D. a decrease in the growth of weeds

- 7 When electricity passes through water, hydrogen and oxygen are produced. Which table correctly labels the compounds and elements involved in the process?

A.

Water—Compound
Hydrogen—Compound
Oxygen—Element

B.

Water—Compound
Hydrogen—Element
Oxygen—Compound

C.

Water—Compound
Hydrogen—Element
Oxygen—Element

D.

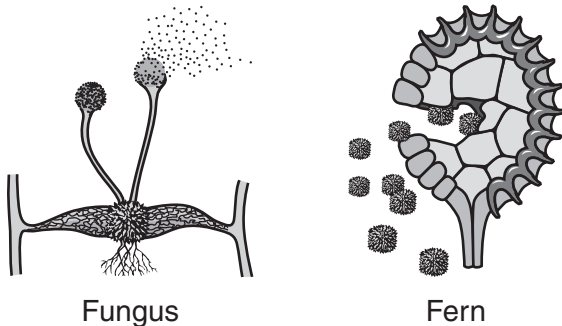
Water—Element
Hydrogen—Element
Oxygen—Compound

PLEASE GO ON ➡

- 8 In a population of spiders there are three different sizes: small, medium, and large. The large spiders are easily seen by predators. Small spiders have a difficult time finding food. What will **most likely** happen to the population after many generations?

A. Medium spiders will be the most plentiful.
B. Large spiders will learn to hide from predators.
C. Small and medium spiders will be the least plentiful.
D. Small and large spiders will mutate.

- 9 The diagram below shows a structure of a fungus and a structure of a fern.



What is the function of these structures?

A. defense
B. movement
C. photosynthesis
D. reproduction

- 10 Which of the following is the farthest from Earth?

A. Halley's comet
B. the Andromeda galaxy
C. Neptune
D. the Sun

- 11 According to scientists, donkeys and horses share a common ancestor. Which evidence shows that the two organisms are related?

A. Both are tall.
B. Both run fast.
C. They have the same diet.
D. They have the same bones in their limbs.

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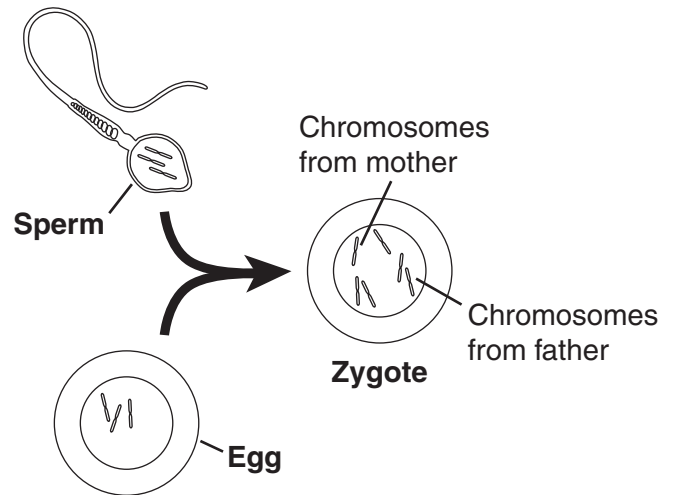
- 12 The map below shows Labrador and England.



What is the **most likely** reason that England is warmer than Labrador?

- A. A warmer ocean current flows nearer to England than to Labrador.
- B. More people live in England than in Labrador.
- C. Labrador receives less sunlight than England.
- D. Labrador has more glaciers than England.

- 13 The diagram below shows the formation of a zygote from an egg and a sperm. Chromosomes carry genetic information.



Which reproduction concept does the diagram show?

- A. All the genetic information in a zygote is from one parent.
- B. All the genetic information in sperm is from both parents.
- C. Fertilization ensures that traits are inherited from both parents.
- D. Fertilization results in a reduced number of chromosomes.

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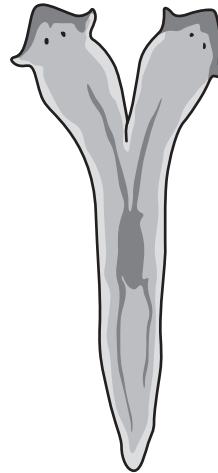
- 14 What is the **most likely** outcome of the Moon moving away from Earth?
- A. A lunar day is shorter.
 - B. A lunar eclipse lasts longer.
 - C. Earth moves closer to the Sun.
 - D. Earth's tides decrease in size.
- 15 Which chemical is a compound?
- A. helium (He)
 - B. hydrochloric acid (HCl)
 - C. hydrogen (H₂)
 - D. nitrogen (N₂)
- 16 How would the Sun appear to an astronaut on Pluto compared with how it looks from Earth?
- A. The Sun would appear larger and brighter.
 - B. The Sun would appear smaller and brighter.
 - C. The Sun would appear larger and dimmer.
 - D. The Sun would appear smaller and dimmer.
- 17 Giant redwood trees change energy from one form to another. How is energy changed by the trees?
- A. They change chemical energy into kinetic energy.
 - B. They change solar energy into chemical energy.
 - C. They change wind energy into heat energy.
 - D. They change mechanical energy into solar energy.

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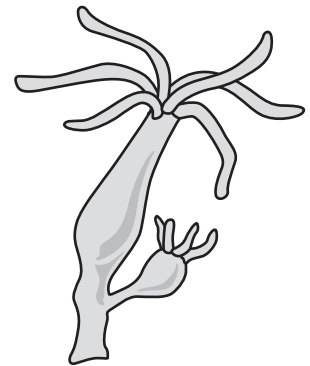
- 18 Penicillin is a drug that kills bacteria. Today, many bacteria are resistant to this drug. How does natural selection **best** explain this observation?
- A. Penicillin causes some bacteria to mutate.
 - B. Some bacteria survive penicillin and reproduce.
 - C. Resistant bacteria cannot be attacked by penicillin.
 - D. Resistant bacteria mutate more quickly than normal bacteria.

- 19 Which observation demonstrates that light waves travel much faster than sound waves?
- A. An exploding firework is seen before it is heard.
 - B. Light from the Sun takes eight minutes to reach Earth.
 - C. Thunder can be heard before lightning is seen.
 - D. A returning echo is heard after a split-second delay.

- 20 The diagrams below show a planarian reproducing by splitting in two and a hydra reproducing by budding.



Planarian



Hydra

Which of the following do the new planarian and hydra have in common with the original planarian and hydra?

- A. The fertilization occurs externally.
- B. The egg and sperm are united.
- C. The offspring of each organism has similar but slightly different genes.
- D. The offspring of each organism is identical to its parent.

PLEASE GO ON ➡

21 Changes that are observed in everyday living are listed below.

- Rusting iron
- Cooking an egg
- Melting ice
- Cutting paper
- Charging a battery
- Mowing grass
- Burning wood
- Making lemonade
- Eating food

- a. Choose **six** changes from the list and identify each change as a physical or a chemical change.
- b. Explain your reasoning for each of your identifications.

22 Corn can be genetically modified to contain a chemical that is poisonous to many insects. All parts of the genetically modified corn plant can make this chemical throughout the life of the corn. When an insect eats any part of the corn plant, the insect eats the chemical and dies. This chemical is harmless to humans and other mammals.

- a. Describe **two** benefits to farmers who use the genetically modified corn.
- b. Describe **two** negative environmental impacts of using the genetically modified corn.

